

REMARKS

Claim 1 has been amended to recite the percentage ranges for high and low performance elastomer previously recited in Claim 4, and the lower percentage limit for the graft copolymer recited in Claim 5. Claim 1 has also been amended to recite that the graft copolymer is formed during solid state shear pulverization of the high and low performance elastomers at a temperature below the melting or softening temperatures of both elastomers. This amendment is supported on page 8, lines 16-31, page 11, lines 15-19 and the Examples. The alternative recitation of “melting or softening temperatures” is appropriate because some elastomers do not have a melting temperature. If an elastomer has a melting temperature, the shear pulverization occurs below that temperature. If an elastomer does not have a melting temperature, the shear pulverization occurs below its softening temperature. Both can be determined using conventional differential scanning calorimetry (D.S.C.) measurement techniques.

Independent Claims 13, 25 and 31 have been amended in similar fashion as Claim 1. Claims 4, 14 and 16 have been canceled.

a) Claim Rejection Based On Walton

The rejection of Claims 1 and 4-35 (excluding canceled Claims 4, 14 and 16) under 35 U.S.C. §102(b) as anticipated by, or under 35 U.S.C. §103(a) as obvious over U.S. Patent 6,479,154 to Walton is respectfully traversed. The Examiner maintains, in the Advisory Action that Walton discloses mixing high and low performance elastomers under conditions that would inherently result in formation of a graft copolymer as claimed. The Examiner disputes the testimony of Dr. Oomman Thomas, who explains in the Declaration filed 10 November 2006, that Walton does not disclose conditions that would inherently lead to the formation of the graft copolymer.

The independent claims have been amended to clearly reflect these differences. Each independent claim states that the graft copolymer is formed during solid state shear pulverization of the high and low performance elastomers at a temperature below the melting temperature of both elastomers. Thus, the high torque and shear generated by the specifically designed twin screw extruder (described on page 8, lines 16-31 and in the Thomas Declaration)

are magnified by an order of magnitude because the polymers are not molten, but are in a solid state. These extreme conditions cause the visbreaking, chemical reaction and grafting to occur.

Walton, by contrast, contains only an off-handed mention of using “high shear” to form a homogeneous blend of different polymers (Col. 7, lines 64-67). The term “high shear” is relative, and is limited by the further disclosure that the two polymers and a required filler are dispersively mixed when the polymers are molten (Col. 12, lines 50-60). Because Walton requires the polymers to be in the molten state, the “high shear” described in Walton will never come close to the much higher levels of shear experienced in Applicants’ solid state pulverization process.

The Examiner maintains that the “high shear” disclosed in Walton (which is much lower than the shear generated during solid state pulverization) will nevertheless form a graft copolymer. The Examiner has relied entirely on hypothesis, and has produced no prior art or other evidence to support this theory. Applicants, by contrast, have produced the testimony of Dr. Thomas to rebut this theory.

Nevertheless, because the term “high shear” in Walton is relative and not defined, it would be difficult to prove or disprove whether a trace or microscopic amount of graft copolymer might result from the mixing conditions described in Walton. In order to address this concern, Applicants have amended the independent claims to raise the minimum amount of graft copolymer by a factor of ten. Each independent claim now requires a minimum of “about 1” weight percent of the graft copolymer. The claimed amount of graft copolymer exceeds a microscopic or trace amount, in order to better distinguish over the conventional melt blending process described in Walton.

Furthermore, Walton recognizes that high and low performance elastomers are incompatible and, accordingly, limits the high performance elastomer to a small percentage amount. As explained at Col. 12, lines 53-57, the blend in Walton contains at least about 35% by weight of a low performance elastomer and at least about 50% by weight of a filler (meaning these components together constitute at least about 85% by weight of the blend). By deduction, this means that another component, such as a high performance elastomer, cannot constitute more than about 15% by weight of the blend. Walton subsequently discloses high performance elastomer at a level of about 5-20% by weight (Col. 10, lines 57-67). However, an amount exceeding 15% is not possible due to the minimum amounts disclosed for the low performance elastomer and filler.

Applicants' amended independent claims, by contrast, require about 20-80% by weight of the high performance elastomer and about 20-80% by weight of the low performance elastomer. Because Applicants compatibilize the two elastomers via the graft copolymer, there is no need to limit the high performance elastomer to the lower amounts disclosed in Walton.

Finally, Walton employs the melt blending step to blend the three components (low performance elastomer, high performance elastomer and filler) in a single blending step (Col. 12, lines 50-60). This factor alone teaches away from using solid state shear pulverization. Solid state shear pulverization cannot accommodate significant amounts of particulate inorganic filler without over-torquing the equipment and damaging the extruder. While Applicants' composition may include a filler, it would be added in a separate mixing step, not during solid state shear pulverization.

Accordingly, no claim is anticipated or obvious over Walton. This rejection should be withdrawn.

b) Conclusion

Applicants believe that the claims, as presented, are in condition for allowance. If the Examiner detects any unresolved issues, then please telephone the undersigned for a telephone interview.

Respectfully submitted,



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